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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/077,184

02/15/2002

Naokuni Muramatsu

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01/06/2004

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EXAMINER

VU, PHUONG T

ART UNIT

PAPER NUMBER

2841

DATE MAILED: 01/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/077,184	MURAMATSU ET AL.	
	Examiner	Art Unit	
	Phuong T. Vu	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 39-46 is/are pending in the application.
- 4a) Of the above claim(s) 42-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39-41 and 46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 May 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>14 July 03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 39-41, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayes et al (US 6,380,903 B1) in view of Zhu et al. (US 6,080,012). Regarding claim 39, Hayes shows (Prior Art figures 3A-3B) a connection construction between a planar antenna 30 and a circuit board installed in a wireless device, said planar antenna comprising a planar antenna element 32 and a plurality of elastically deformable pins (tips of 36, 37) the pins are formed by bending a plurality of thin strips 36, 37 projected from the side end of the planar antenna element in substantially vertical directions with respect to the plane of the planar antenna element at a plurality of portions of the side end of the planar antenna element, said circuit board having upper and lower surface planes. Hayes does not teach that said circuit board comprises a plurality of through holes, wherein the planar antenna is electrically and mechanically connected to the circuit board by detachably inserting the elastically deformable pins into the through holes. However, Zhu discloses a circuit board 5 having upper and lower surface planes with planar metallic shield case 4 having elastically deformable pins 43 that are inserted in through holes in the circuit board and are electrically and mechanically connected to the circuit board such that the elastically deformable pins do not extend beyond the

lower surface plane of the circuit board. The Zhu reference is relied upon solely for this teaching of mechanically and electrically attaching a planar metallic element to a circuit board by inserting elastically deformable pins on the planar metallic element into holes in the circuit board where the elastically deformable pins do not extend beyond the lower surface plane of the circuit board. This method of mounting the planar metallic shield case or any other component is expedient in the art and is equivalent to other known methods such as mounting through use of frictional force, solder, screws or other fasteners. It would have been obvious to those skilled in the art at the time the invention was made to modify the mounting configuration of Hayes which shows mounting pins extending from the metallic element to provide holes in the circuit board as taught by Zhu so that the metallic planar element may be electrically and mechanically connected to the circuit board by inserting the pins of the metallic planar element into the holes of the circuit board to provide an easier, flexible, more reliable and cost effective method of mounting.

Regarding claim 40, Hayes shows that the planar antenna comprises a power supply strip 37 and a short circuit strip 36 formed by bending two thin strips projected from one side end of the antenna element in a substantially vertical direction with respect to the plane of the planar antenna element. Hayes teaches providing pins extending from strips that are elastically deformable by bending and are formed at the tip portions of the strips. Zhu also teaches providing pins 43 extending from strips 42 that are elastically deformable by bending and are formed at the tip portions of the strips. Zhu shows that the pins are mechanically and electrically connected to the

circuit board ground when inserted into the holes of the circuit board. In the above-mentioned combination, the pins of the antenna element, a power supply spring pin and a short circuit spring pin that are elastically deformable by bending would be formed at tip portions of the power supply strip and the short circuit strip. The antenna system of Hayes inherently comprises a power supply circuit and a short circuit provided on the circuit board. The above mentioned combination would necessarily provide a power supply hole and a short circuit hole each having an inner wall to which a power supply conductive layer and a short circuit conductive layer would connect to the power supply circuit and the short circuit so that the power supply spring pin and the short circuit spring pin are detachably inserted into the power supply hole and the short circuit hole of the circuit board in a bending deformable manner so as to connect mechanically and electrically the planar antenna and circuit board for the antenna assembly to function as intended.

Regarding claim 41, it would have been obvious to provide in the above mentioned combination a planar antenna which comprises a plurality of connection spring pins formed by bending a plurality of thin strips projected from a side end of the planar antenna element in a substantially vertical direction with respect to a plane of the planar antenna element at a plurality of portions of the side end of the planar antenna element other than the portions at which the power supply strip and the short circuit strip are formed, said circuit board comprises a plurality of connection holes formed at the portions corresponding to the plural connection spring pins so as to mate with the plural connection spring pins where the power supply circuit, the short circuit, the power

supply conductive layer, and the short circuit conductive layer are formed so as to not interfere with the connection of these components wherein the plural connection spring pins of the planar antenna are inserted into the plural connection holes of the circuit board in a bending deformable manner so as to connect mechanically the planar antenna and the circuit board to further secure the planar antenna. Providing additional connection spring pins would provide a more reliable attachment of the antenna to the circuit board.

Regarding claim 46, Hayes teaches that the planar antenna element may be formed from copper or any other known conductive metal compositions. It would have been obvious to those skilled in the art at the time the invention was made that the planar antenna element may be formed from any of the claimed materials as these materials are conductive, resilient, mechanically strong, and cost effective.

Response to Arguments

3. Applicant's arguments filed 10 October 2003 have been fully considered but they are not persuasive. In Applicant's arguments it is noted that the main goal of Zhu is to prevent solder applied to the surfaces of the holes in the circuit board from the scraped off when the lugs are inserted into the holes. The Examiner agrees with this point. Applicant further states that in the present invention, the structure provides secure and reliable electrical and mechanical connection without the use of a brazing material or solder material. However, it is noted that the claim language does not preclude the use of brazing or solder material for such purposes. Applicant also states that even if Zhu's retention mechanism were easily removed, the brazing material would be scraped from

the surfaces of the holes and would result in a poorer electrical connection. While this may be true, it is noted that the claim language only requires that "the planar antenna is electrically and/or mechanically connected to the circuit board by detachably inserting the elastically deformable pins into the through holes". For the sake of argument, even if the elastically deformable pins of Zhu were not easily detachable or even if it was not desirable to detach these pins from the circuit board, it is believed that the claim language is met, as these deformable pins are detachable.

Regarding the IDS filed 14 July 2003, the cited US reference has been considered. However, the NPL documents have not yet been considered, as they have not been electrically incorporated into the application file. These documents will be considered after they are made available.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong T. Vu whose telephone number is (703) 308-0303. The examiner can normally be reached on Mon. & Tues., 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David S. Martin can be reached on (703) 308-3121. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

PTVu


12/12/03